D–2322	Sub. Code
	36411

DISTANCE EDUCATION

M.Sc. DEGREE EXAMINATION, DECEMBER 2023.

First Semester

Microbiology

GENERAL MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Three-domain concept of classifications.

2. Protista.

3. Confocal microscopy.

4. Crystal violet.

5. Generation time

6. Fimbriae.

7. Endospores.

8. Heterocyst.

9. Lichen.

10. Capsid.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Write short notes on Haeckel's three – Kingdom concept.

Or

(b) Briefly explain about industrial uses of yeast and moulds.

12. (a) Give an account on phase contrast microscope.

Or

(b) Add short note on nutritional types of bacteria.

13. (a) Describe the cell wall structure of Gram-negative bacteria.

Or

(b) Give a brief account on structure of flagella.

14. (a) Write brief note on general characteristics of cyanobacteria.

Or

(b) Discuss in brief about importance of Lichens.

15. (a) Illustrate the ultrastructure of viruses.

Or

(b) Write a brief note on viral envelop and their composition.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain about the classification of bacteria according to Bergey's manual.

17. Write elaborate note on scanning electron microscope.

18. Discuss in detail about differential staining methods.

19. Explain in detail about structure and function of plasma membrane.

20. Elaborate in detail about the life cycle of viruses.

———————

D–2323	Sub. Code
	36412

DISTANCE EDUCATION

M.Sc. DEGREE EXAMINATION, DECEMBER 2023.

First Semester

Microbiology

MICROBIAL BIOCHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

Draw diagrams if necessary.

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What are epimers?
2. Write the energetics equation of glycolysis.
3. What is fluid mosaic model?
4. What are the two interactions that stabilize the double helical structure of DNA?
5. What is allosteric inhibition?
6. What are the theories related to enzyme action?
7. What is abzyme?
8. List any three factors affecting enzyme activity.
9. How penicillin act on microbes?
10. List any two microbial pigments and mention their function.

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) How carbohydrates are classified? Briefly explain their classification.

Or

(b) Differentiate homopolysaccharides and heteropolysaccharides.

12. (a) Briefly describe the amino acid biosynthesis process.

Or

(b) Write a short note on protein classification.

13. (a) What are the other roles of nucleotides than being part of DNA?

Or

(b) Why fatty acid metabolism is vital?

14. (a) Briefly explain the lock and key model.

Or

(b) Write a short note on the properties of enzymes.

15. (a) Explain the action of chlorophyll.

Or

(b) Briefly explain the classification of vitamins.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Give a detail account on glucose metabolism.

17. Write in detail about the four types of protein structure.

18. Explain lipids classification in detail.

19. Explain Michaelis-Menten hypothesis.

20. Give a detail account on biosynthesis and regulation of penicillin.

———————

D–2324

Sub. Code
36413

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

First Semester

MICROBIAL PHYSIOLOGY

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Generation time

2. Thermophils

3. Acetogens

4. Bacteriochloropyll

5. Osmotic stress

6. Heat shock response

7. Nitrogenase enzyme

8. Aerobic respiration

9. Uncouplers

10. Active transport

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Write a brief note on bacterial growth kinetics.

Or

(b) Give a brief account on nutritional types of microorganism.

12. (a) Add note on photosynthetic pigments in bacteria.

Or

(b) Describe the physiology and importance of methylotrophs.

13. (a) Discuss about the physiology nutrient stress in bacteria.

Or

(b) Write in detail about anoxygenic photosynthesis in bacteria.

14. (a) Give an account on nitrogen metabolism.

Or

(b) Briefly explain about the TCA cycle.

15. (a) Write in detail about mechanism of electron transport chain.

Or

(b) Briefly explain about transport across the membrane.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain in detail about growth kinetics of bacteria.

17. Write elaborate note on factors affecting microbial growth.

18. Discuss the mechanism of nitrogen fixation in symbiotic bacteria.

19. Write in detail about mechanism of oxidative phosphorylation.

20. Describe in detail about quorum sensing.

———————

D–2325	Sub. Code
	36421

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Second Semester

MICROBIAL GENETICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

Draw diagrams if necessary.

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What are Mutagens? Mention any two types of mutagens with an example.

2. What is DNA repair mechanism? Mention any two repair mechanisms.

3. What is Base excision repair?

4. What is site-specific recombination?

5. Discuss the biological role of specific recombination.

6. What is Gene-linkage? What is the effect of gene linkage with respect to recombination frequency?

7. What is Transformation?

8. What are the properties of Plasmids?

9. What are retrotransposons?

10. What makes plasmid resistant towards drugs?

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions, by choosing either (a) or (b).

11. (a) What is Nucleotide exchange repair? Explain with diagram.

Or

(b) Write in short the physical mutagens.

12. (a) Explain homologous recombination in context of eukaryotes.

Or

(b) Explain conjugation and its types.

13. (a) Explain arabinose operon and its gene regulation.

Or

(b) What is Gene linkage? Explain its types.

14. (a) Comment on Lac Operon.

Or

(b) Explain the different types of DNA damage.

15. (a) Explain the Bacteriophage Mu.

Or

(b) Comment on epigenetic in bacteria.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain the gene transfer techniques in prokaryotes.

17. Give a detail account on the types of plasmids.

18. Explain plasmid in context of *Agrobacterium* Ti and broad range host plasmid.

19. Explain the positive and negative regulation of Lac Operon. What are the applications?

20. Give a detail account on transposable elements.

———————

D–2326

Sub. Code
36422

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Second Semester

MOLECULAR BIOLOGY AND rDNA TECHNOLOGY

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What are okazaki fragments?
2. Define hyperchromicity.
3. What are Zinc Finger and Leucine Zipper?
4. Explain the role of alkaline phosphatase in rDNA technology.
5. What are shuttle vectors?
6. What is chimeric construct?
7. Define cDNA library.
8. Mention the types of PCR.
9. Define DNA microarray technique.
10. What is CaMV promoter?

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Briefly explain the enzymes involved in DNA replication.

Or

(b) Compare and contrast the structures and functions of mRNA, tRNA and rRNA.

12. (a) Explain the mechanism of prokaryotic transcription termination.

Or

(b) Explain the salient features of YAC vectors with suitable example.

13. (a) Explain the commercial production of penicillin through rDNA technology.

Or

(b) Give a brief note on various steps involved in shot gun cloning.

14. (a) Explain the blue white selection of recombinants with neat illustrations.

Or

(b) Explain the principle of RAPD and its applications.

15. (a) Explain the basic concept of post transcriptional gene silencing and its applications.

Or

(b) Describe the Maxam Gilbert's DNA sequencing method.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain in detail the sequence of events in prokaryotic replication and its difference from eukaryotic replication.

17. Write short notes on (5 Marks each) :

    (a) Phagemids

    (b) SV 40.

18. What is genomic library? Elaborate in detail the steps involved in the construction of genomic libraries and its application.

19. Describe in detail the steps involved in southern blotting technique for the detection of DNA.

20. Discuss the gene transfer methods using microinjection and gene gun method. Add a note on their applications.

———————

D–2327	Sub. Code
	36423

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Second Semester

FOOD AND DAIRY MICROBIOLOGY

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Define water activity.
2. Which microflora is present in fresh food?
3. Enlist the sources of contamination of meat.
4. What is putrefaction and rancidity?
5. What is Rennet? Give its use in dairy industry.
6. List out the Gram-positive rod which causes food borne infection.
7. Name the antimicrobial substance present in milk.
8. Comment on oriental fermented food.
9. What is food sanitation?
10. Differentiate BIS and AGMARK.

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Give a brief account on importance of yeast in food industry.

Or

(b) Explain the effect of nutrient content on microbial growth.

12. (a) Give a brief account on microbial spoilage in canned foods.

Or

(b) Elucidate the role of drying and low temperature in food preservation.

13. (a) Explain the process involved in the production of sauerkraut.

Or

(b) Describe the biochemical activities of microorganisms in milk.

14. (a) Give a brief account on etiology and preventive measures to control botulism.

Or

(b) Briefly explain the criteria for industrial production of phytases.

15. (a) Explain the role of Ozone and hydrogen peroxide as food sanitizers.

Or

(b) Elucidate the PFA specification for tanned milk and ice cream.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Discuss the various features of important group of bacteria that play a significant role in food with suitable examples.

17. Describe in detail about mycotoxins and bacterial toxins in food and their impact on human health.

18. Elaborate the commercial production of edible mushroom. Add a note on its commercial importance.

19. Discuss in detail the industrial production of microbial lipases and its applications.

20. Write short notes on : (2.5 Marks each)

    (a) Botulism

    (b) Aflatoxins

    (c) HACCP system

    (d) MFPO

———————

D–2328

Sub. Code
36431

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Third Semester

IMMUNOLOGY

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Macrophages
2. Innate immunity
3. Cytokine
4. Epitopes
5. Carriers
6. Precipitation reaction
7. T-Cell Receptor Complex
8. MHC class II molecules
9. Myeloma cells
10. Xenograft

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Write in detail about hematopoiesis.

Or

(b) Give shirt note on granulocytes and agranulocytes.

12. (a) Briefly explain structure and functions of IgA.

Or

(b) Describe about T-maturation and types.

13. (a) Explain briefly about antigen antibody interactions.

Or

(b) Write in detail about alternate pathway of complement system.

14. (a) Give an account on engineering of antibody.

Or

(b) Write about type I and type II hypersensitivity reactions.

15. (a) Add short notes on organ transplantation.

Or

(b) Briefly explain about human pluripotent stem cells.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Write in detail about organs of the immune system.

17. Discuss about B- cell differentiation and maturation.

18. Elaborately explain about T dependent and T independent antigens.

19. Write in detail oncogenes and anti-oncogenes.

20. Discuss in detail about types of vaccines.

———————

D–2329

Sub. Code
36432

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Third Semester

MEDICAL MICROBIOLOGY

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What are water exudates?

2. Name the microflora inhabiting the skin.

3. Which test is used to differentiate *Streptococcus pneumoniae* from *S. viridian*?

4. What are non-sporing bacteria? Give examples.

5. How do people get vibrosis?

6. Define Virion.

7. What are oncogenic viruses?

8. Comment on antiparasitic agents.

9. What is the main cause of encephalitis?

10. What are emerging infectious diseases?

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the beneficial role of gut micro biota in human.

Or

(b) Give a brief account on cytological examination of cerebrospinal fluid.

12. (a) Discuss the causatives and clinical symptoms of Anthrax.

Or

(b) Explain the characteristic features and pathogenesis of *Streptococcus pneumoniae*.

13. (a) Write short notes on antigenic variations in influenza virus.

Or

(b) Give brief account on transmission and pathogenesis of Rabies virus.

14. (a) Elucidate the pathogenesis of cutaneous mycotic infections.

Or

(b) Write short notes on surface superficial mycosis.

15. (a) Explain the life cycle of *Entamoeba histolytica* and its clinical symptoms.

Or

(b) Describe the structure and replication cycle of Chikungunya virus.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Enumerate in detail the nosocomial infections with suitable example and its intervention strategies.

17. Elaborate the general characteristics, pathogenesis and diagnosis of *Yersinia enterocolitica*.

18. Describe in detail the structure, replication and clinical manifestation of HIV.

19. Give a detailed classification of antibiotics based on its mechanism of action with suitable example.

20. Describe the morphology, life cycle and pathogenicity of *Plasmodium falciparum*. Add a note on laboratory diagnosis of malignant tertian malaria.

———————

D–2330

Sub. Code
36433

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Third Semester

ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Ecosystem
2. Food webs
3. Gasification
4. Methanogenesis
5. Xenobiotics
6. Biomining
7. Phyllosphere
8. Root nodulation
9. Lipoxygenase
10. Bacterial blight of paddy

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Describe about composition and structure of environment.

Or

(b) Give a brief on ecological pyramids.

12. (a) Write short note on trickling filter.

Or

(b) Briefly explain activated sludge digestion process.

13. (a) Write about the degradation of heavy metals.

Or

(b) Add short notes on greenhouse effect.

14. (a) Discuss in detail about physical and chemical properties of soil.

Or

(b) Add short note on mycorrhizal fungi interaction with plants.

15. (a) Write an account on phosphorous cycle.

Or

(b) Add a brief note on bunchy top of banana.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain in detail about conservation and management of ecosystem.

17. Give elaborate note on liquid waste management.

18. Elaborate the role of rhizosphere microbes in plant growth.

19. Describe in detail about the carbon cycle.

20. Discuss about the biotechnological approaches to plant disease management.

———————

D–2331

Sub. Code
36441

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Fourth Semester

BIOPROCESS TECHNOLOGY

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

Draw Diagrams if necessary

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What are Primary and Secondary Metabolites?
2. Mention the steps of a fermentation process.
3. What are the factors associated with fermentation process?
4. What are antifoam agents?
5. Define an ideal Bioreactor.
6. What is Downstream Processing?
7. Mention any three antibiotics commonly used in fermentation process.
8. What is Bioprocess Technology?
9. What is chromatography?
10. Explain Fermentation Economics.

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Give a general idea on fermentation process.

Or

(b) Explain the types of fermentations.

12. (a) Explain the stochiometry of cell growth.

Or

(b) What are antifoam agents and their role in bio processing?

13. (a) What is the basic design of a microbial fermenter?

Or

(b) Why sterilization of media and fermenters are very important?

14. (a) What is crystallization and whole broth processing?

Or

(b) Explain Lactic acid fermentation.

15. (a) What is the future of bioprocess technology in economy?

Or

(b) What is antibiotic resistance? How bioprocess technology can eradicate antimicrobial resistance?

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain fermentation process in detail.

17. What is sterilization? What are the methods used for sterilizing thermo labile substances?

18. What is scale-up operation? Write about their significance in bio processing.

19. Give a detail account on the production of citric acid and lactic acid.

20. Discuss the ethical implications in bio processing.

———————

D–2332

Sub. Code
36442

DISTANCE EDUCATION

M.Sc. DEGREE EXAMINATION, DECEMBER 2023.

Fourth Semester

Microbiology

MICROBIAL BIOTECHNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What is Algalization?
2. What is the role of heterocyst in blue green algae?
3. What is nematophagy? Give one example.
4. Define microbial herbicides.
5. What is biocompost?
6. List the industrially important microbes.
7. Define transgenic microbes.
8. What is microbial immobilization?
9. What are shuttle vectors?
10. What is GMM risk assessment?

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions, Choosing either (a) or (b).

11. (a) Give a brief account of the economic importance of Algae.

Or

(b) Explain the mechanism of gene transfer by electroporation.

12. (a) Explain the mass production of biofertilizer *Rhizobium*.

Or

(b) Bacillus thuringiensis is called as biopesticide – Explain.

13. (a) Explain the mode of action of bioherbicide in weed management.

Or

(b) Briefly explain about amensalism and its types with suitable examples.

14. (a) Give a brief account on commercial production of factor VII.

Or

(b) Explain the working principle of microbial fuel cells.

15. (a) Describe the advantages of using microbes as bio-sensing element.

Or

(b) What are the risk factors and ethical concerns of GMO?

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Describe the different methods of gene transfer techniques in algal biotechnology.

17. Discuss in detail the role of entomopathogenic fungi in insect pest management.

18. Elaborate in detail the production of microbial polyhydroxyalkanote and its application.

19. Describe the working principle, instrumentation of optical biosensor and its applications.

20. Give a detailed account on molecular tools used for genetic engineering of microbes.

———————

D–2333

Sub. Code
36443

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION,
DECEMBER 2023.

Fourth Semester

BIOINFORMATICS AND BIOSTATISTICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

Draw diagrams if necessary.

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is PubMed?

2. Explain GenBank in short.

3. Mention any two applications of BLAST.

4. What are profiles and motifs?

5. Define Swissprot.

6. Define Skewness.

7. Mention any two kinds of probabilities.

8. Define protein modelling.

9. What is Chi Square test?

10. Define regression.

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Briefly explain about operating systems.

Or

(b) What are biological databases?

12. (a) Explain in brief about genome sequencing.

Or

(b) Briefly explain about analysis of genome sequences.

13. (a) Explain the applications of biostatistics.

Or

(b) Write in short about the random and non-random methods of sampling.

14. (a) Write a short note on predicting 3D structure.

Or

(b) Explain secondary structure prediction.

15. (a) What are the two classifications of ANOVA?

Or

(b) Briefly explain the importance of regression.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Give a detailed account on structural databases.

17. Write in detail about BLAST and its applications.

18. Explain homology modelling in detail.

19. Explain the methods of studying correlation in detail.

20. Write in detail about the methods of studying regression.

———————